National Wildlife Disease Program

1 April 2013

Program Activity Report (PAR)

Toxoplasma gondii in Mute Swans

Toxoplasma gondii is a protozoan parasite that infects virtually all mammals and birds. Although the parasite has been studied in humans and domestic animals, little is known about the genetic diversity of *T. gondii* in wildlife.

Mute swans (*Cygnus olor*) are an exotic species that were introduced into the U.S. in the late 19th century. While they occur in a number of states throughout the country, the majority of birds are located in the Great Lakes and Atlantic coast regions of the U.S. Mute swans often have adverse effects on aquatic habitats, compete with native waterfowl for food, and cause both property and agricultural damage. They also pose a threat to human health and safety with their aggressive behavior and fecal contamination of recreational areas, although the propensity to disseminate disease in their fecal matter has not been thoroughly examined. Consequently, Wildlife Services and some state wildlife agencies actively manage mute swan populations.

We opportunistically sampled birds for *T. gondii* that were removed for damage management purposes. A serum sample and the entire heart were submitted from each swan to the USDA Agricultural Research Services', Animal Parasitic Disease Laboratory in Beltsville, Maryland. Serum samples were tested using the modified agglutination test. Of 632 samples submitted, 54 (8.5%) were seropositive. The hearts of 14 antibody positive swans were then bioassayed in mice and viable *T. gondii* was isolated from three birds. Genetic characterization of these isolates led to the identification of a new genotype (TgSwanUs3). When this new genotype was inoculated into mice, it caused acute toxoplasmosis, confirming it was a virulent, atypical strain of the protozoan.

This is the first report of mute swans as hosts of *T. gondii*. The results indicate that highly virulent strains of *T. gondii* are circulating in the environment and may cause more severe toxoplasmosis when transmitted to humans.

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or refer to the publication:

Dubey, J. P., S. Choudhary, O. C. H. Kwok, L. R. Ferreira, S. Oliveira, S. K. Verma, D. R. Marks, K. Pedersen, R. M. Mickley, A. R. Randall, D. Arsnoe, and C. Su. 2013. Isolation and genetic characterization of Toxoplasma gondii from mute swan (*Cygnus olor*) from the USA. Veterinary Parasitology: http://dx.doi.org/10.1016/j.vetpar.2012.12.051

The original artwork on this page was created by the National Wildlife Disease Program's Erika Kampe and Sarah Goff